# EPINEPHRINE MODULE

SOUTH CAROLINA DEPARTMENT
OF HEALTH AND
ENVIRONMENTAL CONTROL

DIVISION OF EMS AND TRAUMA

# Pathophysiology of Anaphylaxis

- Most people are protected by an immune system that guards against the incursion of foreign substances and micro-organisms that do not belong in the body.
- The word **anaphylaxis** comes from the Greek and means “without protection.”
- An anaphylactic reaction, which is a “superhuman” effort by our body’s immune system to protect us from a foreign invader, can also lead to death if not recognized and treated.

# Patho cont.

- **Allergic Response –** the immune system's reaction to the introduction of a substance that may be harmful to the body. An allergic reaction is manifested by the interaction of antigens and antibodies.
- **Antigens –** Foreign substances that may be introduced into the body and cause formation of antibodies. Antigens can be taken into the body by injection, ingestion, inhalation or absorption.
- **Antibodies –** Protective protein materials produced in the body in response to the introduction of a foreign substance.

# Patho cont.

- **Anaphylaxis** – an allergic reaction in which the antigen-antibody reaction is exhibited in its most severe form. If not recognized and treated quickly, will invariably be fatal.
- **An anaphylactic reaction** may affect the cardiovascular system, respiratory system, neurologic system, digestive tract, and the skin.

# COMMON ALLERGENS/ANTIGENS

## INSECT STINGS

Hymenoptera insect order:

Wasp

Yellow Jacket

Hornet

Fire ant

Honey Bee

# Allergens/Antigens Cont.

**FOODS**

Milk

Egg white

Shellfish / fish

Citrus fruits

Nuts

Beans

Chocolate

# Allergens/Antigens Cont.

**DRUGS**

* Penicillin

Aspirin

Antibiotics

Allergy injections

Hormones (Insulin)

Vaccines

*Parenteral administration of Penicillin is the most common drug induced cause of Anaphylaxis.

# Allergens/Antigens Cont.

**OTHER ALLERGENS/ANTIGENS**

X-ray contrast media

Latex products

# PHYSICAL FINDINGS

It is important to know that any of the signs and symptoms detailed below may be associated with an allergic reaction. Signs and symptoms may range from simple sneezing ( a mild allergic reaction) to severe respiratory distress and hypotension in Anaphylaxis.

Prompt recognition of signs and symptoms is imperative!

# Physical Findings Cont.

**SKIN**

1. Patient may state that he has a warm, tingling feeling in the face, mouth, chest, feet and hands.
2. Pruritis (severe or mild itching)
3. Urticaria (hives)
4. Erythema (red, flushed skin)
5. Edema to face, neck, hands, feet and/or tongue

# Physical Findings Cont.

**RESPIRATORY**

1. Patient may complain of tightness in the throat/chest
2. Cough
3. Tachypnea (rapid breathing)
4. Dyspnea (difficulty breathing)
5. Stridor caused by larynogospasm

# Physical Findings Cont.

**RESPIRATORY SIGNS/SYMPTOMS CONT.**

6. Wheezing caused by severe broncho-constriction (audible without stethoscope)
7. Hoarseness
8. Laryngeal edema
9. Sneezing

# Physical Findings Cont.

## CARDIAC

1. Tachycardia
2. Cardiac dysrhythmias
3. Hypotension

# Physical Finding Cont.

## GASTROINTESTINAL

1. Nausea and vomiting
2. Diarrhea
3. Abdominal pain and cramping

# Physical Findings Cont.

## GENERAL FINDINGS

1. Itchy, watery eyes
2. Headache
3. Sense of impending doom
4. Rhinorrhea (runny nose)

# Physical findings cont.

**NEUROLOGICAL**

1. Seizures
2. Impaired, decreased level of consciousness
3. Sense of impending doom

# ASSESSMENT AND TREATMENT

A. Perform initial assessment
B. Complete focused history and physical examination
1. History of allergies?
2. What was the patient exposed to?
3. How was the patient exposed?
4. What affects is the exposure having on the patient?
5. Progression of signs/symptoms
6. Interventions

# Assess/Treat Cont.

c. Assess baseline vitals and complete SAMPLE history.
d. Administer high flow oxygen if not already done in initial assessment.

# Assess/Treat Cont.

e. **IF SIGNS AND SYMPTOMS INDICATIVE OF A SEVERE ALLERGIC REACTION ARE PRESENT:**

**CALL IMMEDIATELY FOR ALS BACKUP**

1. Determine if patient has a prescribed epinephrine auto-injector and if the auto-injector has been administered prior to your arrival. If so, document the approximate time of administration.

# Assess/Treat Cont.

2. If the patient has a prescribed auto-injector and it is immediately available, assist the patient in administration of their prescribed auto-injector per protocol.

3. If the patient's prescribed auto-injector is not available, begin immediate preparations for administering the epinephrine auto-injector stocked on the ambulance.

# Assess/Treat Cont.

4. Contact medical control for permission to administer the epinephrine auto-injector or follow pre-established protocols if medical control cannot be contacted.

5. Prior to administration, examine medication: Is the drug the correct drug? Look for discoloration, cloudiness, expiration date.

# Assess/Treat Cont.

**Prepare epinephrine auto-injector for administration:**

1. Remove gray safety cap from the auto-injector
2. Identify correct site for administration
   a. Lateral portion of thigh
   b. Midway between waist and the knee

# Assess/Treat Cont.

7. Place the black tip of the epinephrine auto-injector firmly against the thigh until the injector activates.
8. Hold the epinephrine auto-injector in place until the medication is injected (usually about 10 seconds).
9. Document administration site, patient response and side effects on patient care form.
10. Dispose of epinephrine auto-injector in sharps container.

# DOSAGES/PACKAGING

a. Patients weighing less than 66 lbs (30 kgs) 0.15 mg=0.3mL of solution of epinephrine (1.7 mL of solution will remain in the auto-injector after use).
b. Patients weighing more than 66 lbs (30 kgs) 0.3 mg=0.3 mL of 1:1000 solution of epinephrine (1.7 mL of solution will remain in the auto-injector after use).

# Dosages/Pack Cont.

The Epi-Pen and Epi-Pen, Jr. contain a single dose of epinephrine.

# ONGOING ASSESSMENT AND TREATMENT

a. Transport
b. Continue focused assessment

1. **Patient's condition continues to worsen**

a. Decreasing mental status
b. Increasing dyspnea
c. Decreasing blood pressure

# Ongoing Assess/Treat. Cont.

2. Contact medical control or refer to per-determined protocols.
3. If patient's condition warrants, administer second dose of epinephrine via auto-injector.
4. Treat for shock (hypoperfusion)

# Ongoing Assess/Treat. Cont.

5. Prepare to initiate basic cardiac life support.
6. Cardiopulmonary resuscitation
7. Automated external defibrillator

# Ongoing Assess/Treat. Cont.

If patient's condition improves, provide supportive care, to include:

a. Oxygen
b. Treat for shock (hypoperfusion)
c. Document second dose of epinephrine on patient care form.
d. Reassess patient every 5 minutes en-route to the hospital.

# RECOGNITION AND TREATMENT OF MILD ALLERGIC REACTIONS

1. If patient has had contact with a substance that causes an allergic reaction WITHOUT signs and symptoms of respiratory distress and shock (hypoperfusion):

a. Continue with focused assessment.

b. Reassess every five minutes en-route to the hospital.

c. Contact medical control or follow protocols.

# Recognize/Treat Mild Allergic Reactions Cont.

2. A patient that is not wheezing or has no signs of respiratory distress or shock (hypoperfusion) should not receive epinephrine.

# PHARMACOLOGY

The autonomic nervous system is responsible for control of involuntary bodily functions associated with the respiratory, cardiac, digestive, and reproductive systems.

# Pharmacology Cont.

The autonomic nervous system has two major components:

a. The PARASYMPATHETIC division, sometimes called the “feed or breed” division, primarily controls vegetative functions such as digestion and reproduction.

b. The SYMPATHETIC division, sometimes termed the “fight or flight,” or adrenergic system, is that component of the autonomic system that prepares the body to react in stressful situations.

# Pharmacology Cont.

- Certain drugs, called sympathomimetics, can act directly on receptors in the sympathetic nervous system.

- Epinephrine is an important sympathetic nervous system stimulant.

# INDICATIONS FOR USE OF THE EPINEPHRINE AUTO-INJECTOR

Severe allergic reaction due to introduction of allergens into the body with the patient exhibiting the following signs/symptoms:

1. Severe generalized hives or swelling to the face neck, hands, feet or tongue.
2. Difficulty swallowing.
3. Dyspnea

# Indications Cont.

4. Hoarseness
5. Stridor
6. Wheezing
7. Tightness in throat/chest

# Indications Cont.

8. Decreased mental status
9. Shock (hypoperfusion)

# SIDE EFFECTS OF EPINEPHRINE

1. Increased heart rate (tachycardia)
2. Palpitations
3. Pallor
4. Dizziness

# Side Effects Cont.

5. Chest pain
6. Headache
7. Nausea/vomiting

# Side Effects Cont.

8. Excitability and anxiousness
9. Dilated pupils

# CONTRAINDICATIONS/ PRECAUTIONS

- There are no absolute contraindications to the use of epinephrine in a life-threatening situation.
- Epinephrine is administered with extreme caution to patients who have a history of cardiovascular disease.

# DOSAGE/ PACKAGING

1. EpiPen auto-injector 0.3 mg/0.3 delivered 2.0 mL volume in syringe.

2. EpiPen auto-injector 0.15 mg/0.3 mL delivered 2.0 mL volume in syringe.

# CARE AND STORAGE OF THE AUTO-INJECTOR

1. Store in a dark place at room temperature.
2. Do not refrigerate.
3. Do not expose to extreme heat or cold.

# Care/Store Cont.

4. Note expiration date on unit. Replace before expiration date.
5. Examine contents in clear window of the auto-injector monthly.

# Care/Store Cont.

6. Replace the auto-injector if the solution is discolored or contains solid particles.
7. Plastic carrying tube provides extra UV protection.